Math and Computers, Math 165
Review Problems

1. State Descartes' rule of signs and explain it with an example.

2. State Sturm's theorem and Rolle's theorem. Give examples.

3. Explain a method you can use to decide whether a polynomial has roots of high multiplicity. Use it to test whether $x^3 - 2x^2 - 4x + 8$ has multiple roots.

4. True or false: $4x^5 - 3x^4 - 2x^2 + 4x - 10$ has a single real root.

5. True or false: The set of polynomials $p \in Q[x, y, z]$ such that $p(t^2, t^3, t^4) = 0$ is an ideal.

6. Is x^2 an element inside the ideal $\langle x - y^2, xy \rangle$? Is $\langle x - y^2, xy \rangle = \langle x^2, xy \rangle$?

7. Show that the ideal $J = \langle f_1, f_2, \ldots, f_k \rangle$ is closed under sums and also if $f \in J$ and p is any other polynomial then $p \cdot f \in J$.